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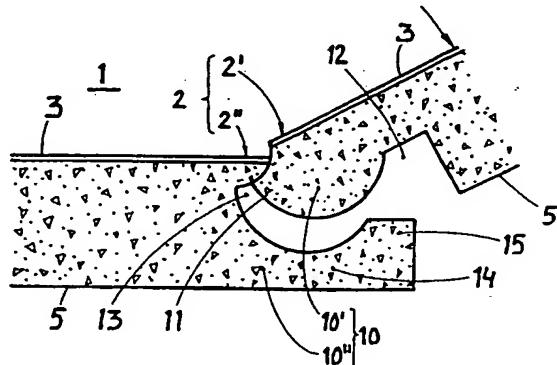
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(54) Title: A FLOORING MATERIAL COMPRISING SHEET-SHAPED FLOOR ELEMENTS WHICH ARE JOINED BY MEANS OF JOINING MEMBERS



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(57) **Abstract:** Flooring material comprising sheet-shaped floor elements (1) with a mainly square or rectangular shape. The floor elements (1) are provided with edges (2), a lower side (5) and an upper decorative layer (3). The floor elements (1) are intended to be joined by means of joining members (10). The floor elements (1) are provided with male joining members (10<sup>I</sup>) on a first edge (2<sup>I</sup>) while a second edge (2<sup>II</sup>) of the floor elements (1) are provided with a female joining member (10<sup>II</sup>). The male joining member (10<sup>I</sup>) is provided with a tongue (11) and a lower side (5) groove (12) while the female joining member (10<sup>II</sup>) is provided with a groove (13) and a cheek (14), the cheek (14) being provided with a lip (15). The floor elements (1) are provided with a male vertical assembly joining member (10<sup>III</sup>) on a third edge (2<sup>III</sup>) while a fourth, opposite, edge (2<sup>IV</sup>) is provided with female vertical assembly joining member (2<sup>IV</sup>). The floor elements (1) are alternatively provided with a male vertical assembly joining member (10<sup>III</sup>) on a third edge (2<sup>III</sup>) while a fourth, opposite, edge (2<sup>IV</sup>) also is provided with male vertical assembly joining member (2<sup>III</sup>). Adjacent male vertical assembly joining members (2<sup>III</sup>) are hereby joined by means of a separate vertical assembly joining profile (30). Two adjacent edges (2) of a floor element (1) can hereby, at the same time, and in the same turning motion, be joined with a floor element (1) adjacent to the first edge (2<sup>I</sup>) and a floor element adjacent to the third or fourth edge (2<sup>III</sup> and 2<sup>IV</sup> respectively).

the groove when assembled. The profiles are integrated with the floor boards through folding or alternatively, through gluing.

According to WO 94/26999, the floor boards may be joined by turning or prizing it into position with the long side edge as a pivot point. It is then necessary to slide the floor board longitudinally so that it snaps into the floor board previously installed in the same row. A play is essential in order to achieve that. This play seems to be marked  $\Delta$  in the figures. A tolerance of  $\pm 0.2\text{mm}$  is mentioned in the application. Such a play will naturally cause undesired gaps between the floor boards. Dirt and moisture can penetrate into these gaps.

It is also known through WO 97/47834 to manufacture a joint where the floor boards are joined by turning or prizing it into position with the long side edge as a pivot point. According to this invention a traditional tongue has been provided with heel on the lower side. The heel has a counterpart in a recess in the groove of the opposite side of the floor board. The lower cheek of the groove will be bent away during the assembly and will then snap back when the floor board is in the correct position. The snap-joining parts, i.e. the tongue and groove, is in opposite to the invention according to WO 94/26999 above, where they are constituted by separate parts, seems to be manufactured monolithically from the core of the floor board. WO 97/47834 does also show how the tongue and groove with heels and recesses according to the invention is tooled by means of cutting machining. This invention does also have the disadvantage that the best mode of joining floor boards includes longitudinal sliding for joining the short sides of the floor boards, which also here will require a play which will cause unwanted gaps between the floor boards. Dirt and moisture can penetrate into these gaps.

It is, through the present invention, made possible to solve the above mentioned problems whereby a floor element which can be assembled without having to be slided along already assembled floor elements has been achieved. It is thereby made possible to achieve tighter joints. Accordingly, the invention relates to a flooring material comprising sheet-shaped floor elements with a mainly square or rectangular shape. The floor elements are provided with edges, a lower side and an upper decorative layer. The floor elements are intended to be joined by means of

According to one embodiment of the invention, the floor elements are provided with male vertical assembly joining members on a third edge and provided with female vertical assembly joining members on a fourth edge. The male vertical assembly joining members are provided with mainly vertical lower cheek surfaces arranged parallel to the closest edge. The lower cheek surfaces are intended to interact with mainly vertical upper cheek surfaces arranged on the female vertical assembly joining members so that two joined adjacent floor elements are locked against each other in a horizontal direction. The male and female vertical assembly joining members are provided with one or more snapping hooks with matching under cuts which by being provided with mainly horizontal locking surfaces limits the vertical movement between two joined adjacent floor elements.

The floor elements may alternatively be provided with male vertical assembly joining members on both a third and a fourth edge. These edges are then snap joined by means of a vertical assembly profile which on both sides of a longitudinal symmetry line is designed as a female vertical assembly joining member according to the description above. Two joined adjacent floor elements are locked to each other in a horizontal direction via the vertical assembly profile while, at the same time, vertical movement between two joined adjacent floor elements is limited.

The joint between a third and a fourth edge of two joined floor elements preferably comprises contact surfaces which are constituted by the horizontal locking surfaces of the under cuts and hooks, the mainly vertical upper cheek surfaces and lower cheek surfaces as well as upper mating surfaces.

The joint between two joined floor elements suitably also comprises cavities.

According to one embodiment of the invention the snapping hook is constituted by a separate spring part which is placed in a cavity. Alternatively the undercut is constituted by a separate spring part which is placed in a cavity. The spring part is suitably constituted by an extruded thermoplastic profile, a profile of thermosetting resin or an extruded metal profile.

-figure 3 shows, in cross-section, a third embodiment of a first and a second edge 2<sup>I</sup> and 2<sup>II</sup> respectively, during joining.

-figure 4 shows, in cross-section, a fourth embodiment of a first and a second edge 2<sup>I</sup> and 2<sup>II</sup> respectively, during joining.

-figure 5 shows, in cross-section, a third and a fourth edge 2<sup>III</sup> and 2<sup>IV</sup> respectively, during joining.

-figure 6 shows, in cross-section, a second embodiment of a third and a fourth edge 2<sup>III</sup> and 2<sup>IV</sup> respectively, during joining.

-figure 7 shows, in cross-section, a third embodiment of a third and a fourth edge 2<sup>III</sup> and 2<sup>IV</sup> respectively, during joining.

-figure 8 shows, in cross-section, a fourth embodiment of a third and a fourth edge 2<sup>III</sup> and 2<sup>IV</sup> respectively and a vertical assembly joining profile 30, during joining.

Accordingly figure 1 shows, in cross-section, a first and a second edge 2<sup>I</sup> and 2<sup>II</sup> respectively, during assembly. The figure shows parts of a flooring material comprising sheet-shaped floor elements 1 with a mainly square or rectangular shape. The floor elements 1 are provided with edges 2, a lower side 5 and an upper decorative layer 3. The floor elements 1 are intended to be joined by means of joining members 10. The floor elements 1 are provided with male joining members 10<sup>I</sup> on a first edge 2<sup>I</sup> while a second edge 2<sup>II</sup> of the floor elements 1 are provided with a female joining member 10<sup>II</sup>. The second edge 2<sup>II</sup> is arranged on a side opposite to the first edge 2<sup>I</sup>. The male joining member 10<sup>I</sup> is provided with a tongue 11 and a lower side 5 groove 12. The female joining member 10<sup>II</sup> is provided with a groove 13 and a cheek 14, the cheek 14 being provided with a lip 15. The floor elements 1 are intended to mainly be joined together by tilting the floor element 1 to be joined with an already installed floor element 1 or a row of already installed floor elements 1, with the male joining member 10<sup>I</sup> of the floor element 1 angled downwards and that the first edge 2<sup>I</sup> is allowed to be mainly

mainly horizontal locking surfaces limits the vertical movement between two joined adjacent floor elements 1.

The joint between a third and a fourth edge 2<sup>III</sup> and 2<sup>IV</sup> respectively of two joined floor elements 1 further comprises contact surfaces which are constituted by the horizontal locking surfaces of the under cuts 23 and hooks 24, the mainly vertical upper cheek surfaces 22 lower cheek surfaces as well as upper mating surfaces 25. The joint between two joined floor elements 1 also comprises cavities 6.

The embodiment shown in figure 6 corresponds in the main with the one shown in figure 5. The male vertical assembly joining members 10<sup>III</sup> are, however, provided with only one snapping hook 23 while the female vertical assembly joining members 10<sup>IV</sup> are provided with a matching undercut 24, which by being provided with mainly horizontal locking surfaces limits vertical movement between two joined adjacent floor boards 1.

The embodiment shown in figure 7 corresponds in the main with the one shown in figure 6. The snapping hook 23 on the male vertical assembly joining member 10<sup>III</sup> is, however, moved somewhat inwards in the floor element 1 whereby a guiding angle is formed above the undercut 24 of the female vertical joining member 10<sup>IV</sup>.

The embodiment shown in figure 8 corresponds mainly with the one shown in figure 7. Both the third and the fourth edges 2<sup>III</sup> and 2<sup>IV</sup> respectively are, however, provided with male vertical assembly joining members 10<sup>III</sup>. A vertical assembly joining profile 30, provided with a female vertical assembly joining profile 10<sup>IV</sup> on both sides of a vertical symmetry line, is used for joining the two floor elements 1. The female vertical assembly joining members 10<sup>IV</sup> of the vertical assembly joining profile 30 are equipped similar to the female vertical assembly joining members 10<sup>IV</sup> in figure 7 above.

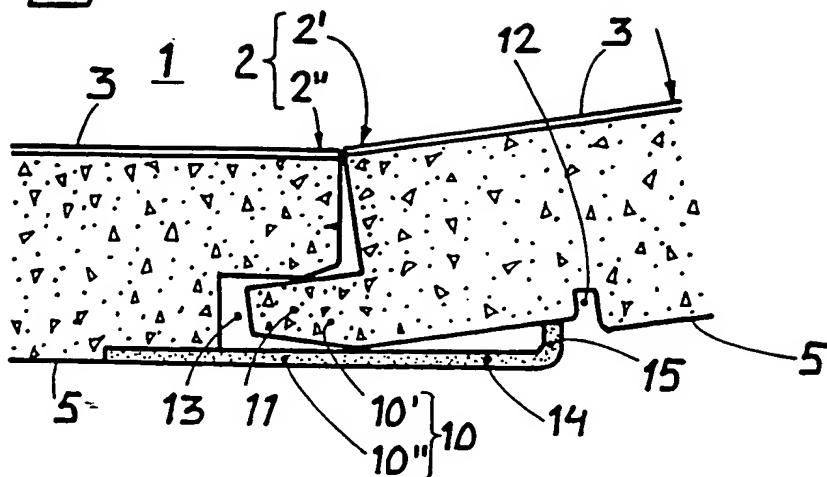
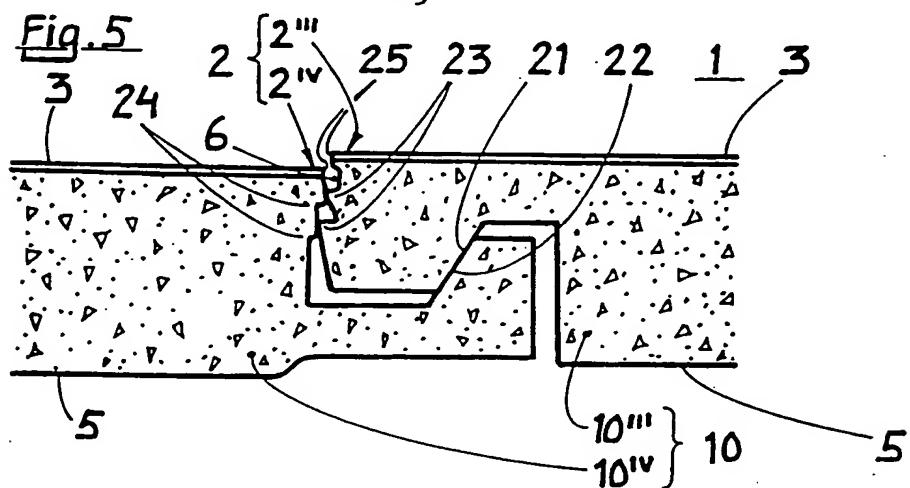
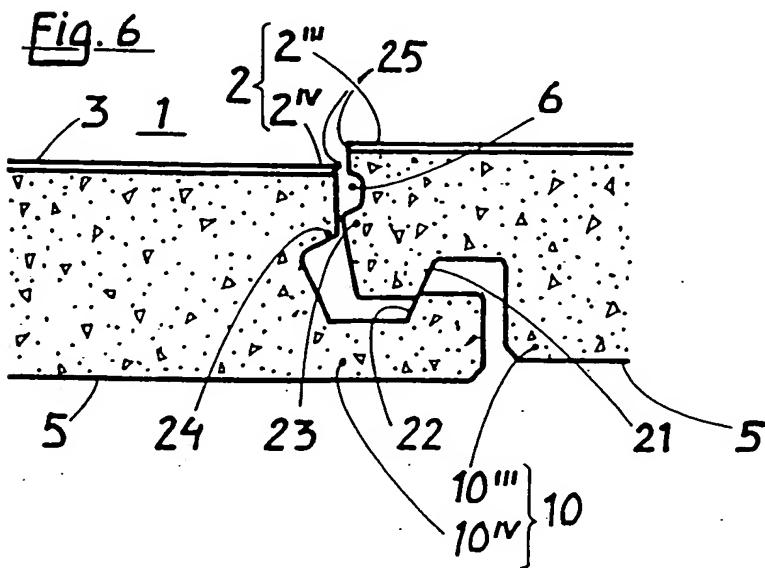
Two adjacent edges 2 of a floor element 1 can at the same time, and in the same turning motion, be joined with a floor element 1 adjacent to the first edge 2<sup>I</sup> and a floor element 1 adjacent to the third or fourth edge 2<sup>III</sup> and 2<sup>IV</sup> respectively, when assembling floor elements 1 according to the above described embodiments.

**CLAIMS**

1. Flooring material comprising sheet-shaped floor elements (1) with a mainly square or rectangular shape, which floor elements (1) are provided with edges (2), a lower side (5) and an upper decorative layer (3), whereby the floor elements (1) are intended to be joined by means of joining members (10), characterised in that,
  - a) the floor elements (1) are provided with male joining members (10<sup>I</sup>) on a first edge (2<sup>I</sup>) while a second edge (2<sup>II</sup>) of the floor elements (1) are provided with a female joining member (10<sup>II</sup>), whereby the male joining member (10<sup>I</sup>) is provided with a tongue (11) and a lower side (5) groove (12) while the female joining member (10<sup>II</sup>) is provided with a groove (13) and a cheek (14), the cheek (14) being provided with a lip (15), whereby the floor elements (1) are intended to mainly be joined together by tilting the floor element (1) to be joined with an already installed floor element (1) or a row of already installed floor elements (1), with the male joining member (10<sup>I</sup>) of the floor element (1) angled downwards and that the first edge (2<sup>I</sup>) is allowed to be mainly parallel to the second edge (2<sup>II</sup>) of the already installed floor element (1) or elements (1), whereby the tongue (11) of the tilted floor element (1) is inserted into the groove (13) of the female joining member (10<sup>II</sup>) of the already installed floor element (1) or elements (1), whereby the tilted floor element (1) is turned downwards, with its lower edge as a pivot axis, so that the lip (15) eventually snaps into the lower side (5) groove (12) where the decorative upper layer (3) of the floor elements (1) are mainly parallel, and that,
  - b) the floor elements (1), on a third edge (2<sup>III</sup>), are provided with a male vertical assembly joining member (10<sup>III</sup>) while a fourth edge (2<sup>IV</sup>) is provided with female vertical assembly joining member (10<sup>IV</sup>), the fourth edge (2<sup>IV</sup>) being arranged on a side opposite to the third edge (2<sup>III</sup>), or that,
  - c) the floor elements (1) on a third edge (2<sup>III</sup>), are provided with a male vertical assembly joining member (10<sup>III</sup>) while a fourth edge (2<sup>IV</sup>) also is provided with male vertical assembly joining member (10<sup>IV</sup>), the fourth edge (2<sup>IV</sup>) being arranged on a side opposite to the third edge (2<sup>III</sup>), whereby adjacent male vertical assembly joining members (10<sup>III</sup>) are joined

5. Flooring material according to any of the claims 1 - 4, characterised in that the joint between two joined floor elements (1) also comprises cavities (6).
6. Flooring material according to any of the claims 2 - 5, characterised in that the snapping hook (23) is constituted by a separate spring part (7) which is placed in a cavity (6).
7. Flooring material according to any of the claims 2 - 5, characterised in that the undercut (24) is constituted by a separate spring part (7) which is placed in a cavity (6).
8. Flooring material according to claims 6 or 7, characterised in that the spring part (7) is constituted by an extruded thermoplastic profile.
9. Flooring material according to claims 6 or 7, characterised in that spring part (7) is constituted by a profile of a thermosetting resin.
10. Flooring material according to claims 6 or 7, characterised in that spring part (7) is constituted by an extruded metal profile.
11. Flooring material according to any of the claims 1 - 10, characterised in that the joining members (10) and/or the floor elements (1) are coated with twin-faced adhesive tape or glue.

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Fig. 4Fig. 5Fig. 6

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## A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	SE 457737 B (RY AB), 23 January 1989 (23.01.89), page 1, line 25 - line 32, figures 1-3 --	1-11
Y	WO 9747834 A1 (BEHEER B.V.), 18 December 1997 (18.12.97), figures 22,23, abstract --	1-11
Y	DE 19601322 A1 (ABRAHAMS, JACOB), 28 May 1998 (28.05.98), abstract, detail 13 --	1-11
A	DE 2159042 A (HEBGEN, H.), 14 June 1973 (14.06.73), figures 1,2,4 -----	1-11

 Further documents are listed in the continuation of Box C.  See patent family annex.

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